

**601.16-PAY ITEMS:**

ITEM	DESCRIPTION	UNIT
601001-*	CLASS A CONCRETE	CUBIC YARD (METER)
601002-*	CLASS B CONCRETE	CUBIC YARD (METER)
601003-*	CLASS K CONCRETE	CUBIC YARD (METER)
601005-*	CLASS C CONCRETE	CUBIC YARD (METER)
601006-*	CLASS D CONCRETE	CUBIC YARD (METER)

\*Sequence number

## SECTION 602

### REINFORCING STEEL

**602.1-DESCRIPTION:**

This work shall consist of furnishing and placing epoxy coated or uncoated reinforcing steel in accordance with these Specifications and in reasonably close conformity with the Plans.

**602.2-MATERIALS:**

Reinforcing steel bars and fabric reinforcement shall meet the requirements of 709.1 and 709.4 respectively, except rail-steel shall not be used in bridge decks or parapets.

Epoxy coated reinforcing steel bars shall meet the requirements of 709.1.2, except rail-steel shall not be used in bridge decks and parapets.

## CONSTRUCTION METHODS

**602.3-ORDER LISTS:**

All order lists and bending diagrams shall be furnished by the Contractor. If requested by the Engineer, order lists and bending diagrams shall be submitted for approval. Approval of order lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for the correctness of such lists and diagrams.

**602.4-PROTECTION OF MATERIALS:**

Steel reinforcement shall be stored above the well drained surface of the ground upon platforms, skids, or other supports and shall be protected from mechanical injury. Reinforcement shall be free from injurious defects such as cracks and laminations. Any loose scale, loose rust, dirt, paint, grease, oil or other foreign materials present on the reinforcement shall be removed by wire brushing, sand blasting or other approved methods before the placement of concrete.

Reinforcing steel which will be exposed over the winter shall be protected, within one week after the placing of the initial concrete, with a brush coat of neat cement, mixed with water to a consistency of thick paint. This coating shall be removed by lightly tapping with a hammer or other tool not more than one week before the placing of the adjacent pour.

**602.5-BENDING OF REINFORCING BARS:**

Unless otherwise permitted, all reinforcing bars shall be cold bent in the shop. Bars partially embedded in concrete shall not be field bent except when shown on the Plans or permitted by the Engineer. Only competent men shall be employed for cutting and bending, and proper appliances shall be provided for the work.

Bending shall be in accordance with the Manual of Standard Practice for Detailing, Reinforced Concrete Structures, ACI 315, latest revision. Rail-steel bars shall not be field bent or straightened.

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**602.6-PLACING AND FASTENING:**

**602.6.1-General:** All reinforcing steel shall be accurately placed and, during the placing of concrete, firmly held by supports in the position shown on the Plans. Reinforcing bars shall be securely fastened together. Bars shall be tied at all intersections except where spacing is less than 1 ft. (300 mm) in each direction, in which case alternate intersections shall be tied. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, chairs, or other approved supports. Blocks for holding reinforcement from contact with forms shall be precast mortar blocks of approved shape and dimension; the use of pebbles, broken stone, metal pipe or wooden blocks will not be permitted. Reinforcement in any member will be inspected and approved before any concrete is placed.

**602.6.2-Epoxy Coated Bars:** Epoxy coated bars shall be placed on plastic coated wire supports. Supports shall be installed in a manner to prevent planes of weakness in the hardened concrete. The reinforcing steel shall be held in place by use of plastic or plastic coated tie wires especially fabricated for this purpose.

Any visible damage to the epoxy coating of the reinforcing steel that occurs during shipment, storage and installation of the steel shall be repaired. The patching Supplier shall furnish patching material to the project with the first shipment of epoxy coated steel. The patching material shall be prequalified as required for the coating material and shall be either identified on the container as meeting the requirements of AASHTO M284, Annex A or shall be accompanied by a Certificate of compliance. Patching of damaged areas shall be performed in accordance with the patching material manufacturer's recommendations.

In the event it is anticipated that the epoxy bars will be stored on the project site, and/or placed in final position without the concrete cover for a period of 90 days or more, then the bars shall be stored in a temporary shed or covered with plastic to prevent damage to the epoxy coating due to ultra-violet rays or other atmospheric conditions. Any temporary storage means used, shall provide adequate ventilation to the bars to prevent the build up of moisture on

the bar surface.

### **602.7-BAR SPLICES:**

**602.7.1-Lapping:** All reinforcement shall be furnished in full lengths as indicated on the Plans. No splicing of bars, except where shown on the Plans, will be permitted without the written approval of the Engineer. Lapped splices shall have a length of lap not less than 30 bar diameters and shall be well distributed or located at points of low tensile stress. The bars shall be rigidly clamped or wired at all splices in a manner approved by the Engineer.

**602.7.2-Welding:** Splicing by welding of reinforcement will be permitted only if detailed on the Plans or if authorized by the Engineer in writing. Welding shall comply with the current specifications of the American Welding Society, D 1.4, and the weld shall develop an ultimate strength equal to or greater than that of the bars connected.

**602.7.3-Mechanical Splice Connectors:** Mechanical splice connectors shall develop in tension or compression at least 125 percent of the specified yield strength of the bar.

### **602.8-FABRIC REINFORCEMENT:**

Mesh sheets or uncoated reinforcing steel, except steel mesh, will be measured by the pound (kg), based on Plan lengths and numbers of bars, using the unit weights in Table 602.9. The quantity for payment will be the number of pounds (kg) established in the Proposal, placed as shown on the Plans or directed, complete in place and accepted, subject to adjustment as provided for in [104.2](#) and [109.2](#).

### **602.9-METHOD OF MEASUREMENT:**

Epoxy coated or uncoated reinforcing steel, except steel mesh, will be measured by the pound (kg), based on Plan lengths and numbers of bars, using the unit weights in Table 602.9. The quantity for payment will be the number of pounds (kg) established in the Proposal, placed as shown on the Plans or directed, complete in place and accepted, subject to adjustment as provided for in [104.2](#) and [109.2](#).

TABLE 602.9

Bar Designation	Weight Per Lin. Ft. in Lb. ( <u>Mass</u> kg per meter)	Bar Designation	Weight Per Lin Ft. in Lb. ( <u>Mass</u> kg per meter)
# 3 (10)	0.376 (.560)	# 9 (29)	3.400 (5.060)
# 4 (13)	0.668 (.994)	# 10 (32)	4.303 (6.404)
# 5 (16)	1.502 (1.552)	# 11 (36)	5.313 (7.907)
# 6 (19)	1.502 (2.235)	# 14S (43)	7.650 (11.38)
# 7 (22)	2.044 (3.042)	# 18S (57)	13.600 (20.24)
# 8 (25)	2.670 (3.973)		

If the Engineer allows the substitution of bars larger than those specified, payment will be made for only the amount of steel which should have been required if the specified bars had been used.

If the Contractor, for convenience in transporting or placing steel, is permitted to use bar lengths shorter than those shown on the Plans, the weights paid for will be based on the lengths shown on the Plans with no allowance for extra laps. No direct payment will be made for metal chairs, spacers, clips, wire, or other mechanical means used for fastening or holding reinforcement in place; the cost of these devices shall be included in the contract price for the reinforcing steel.

The cost of furnishing and placing steel mesh, if required, shall be included in the contract unit price for the concrete in which it is placed and no further payment will be made.

**602.10-BASIS OF PAYMENT:**

The quantity, determined as provided above, will be paid for at the contract unit price bid for the items listed below, which price and payment shall be full compensation for furnishing, fabricating, transporting, storing and placing epoxy coated or uncoated reinforcing steel; and the furnishing of all other materials and doing all the work described in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

**602.11-PAY ITEMS:**

ITEM	DESCRIPTION	UNIT
602001-*	REINFORCING STEEL BAR	POUND (KILOGRAM)
602002-*	EPOXY COATED REINFORCING STEEL BAR	POUND (KILOGRAM)

\* Sequence Number

## SECTION 603

### PRESTRESSED CONCRETE MEMBERS

**603.1 DESCRIPTION:**

This work consists of the construction of precast/prestressed concrete members, pretensioned in accordance with these specifications and in conformity with the plan details and notes. This work shall include manufacturing, inspection, handling, storing, transporting and erecting of structural members of precast/prestressed concrete, and, when specified, shall also include precast concrete members which do not contain pretensioning steel components.

Concrete floors, curbs, parapets, curtain walls, and diaphragms shall be cast in place on the project unless otherwise provided for on the plans. When the above elements are specified as precast members, they shall be manufactured in accordance with this specification.

**603.2 MATERIALS**

**603.2.1 Materials Details:** Materials shall meet the requirements specified in the following Sections/Subsections:

Precast / Prestressed Concrete Materials	Sections / Subsections
Cement .....	701.1, 701.3
#Fine Aggregates .....	702.1
*Coarse Aggregates .....	703.1, 703.2, & 703.3
+Admixtures:	
Air Entraining Admixtures .....	707.1
Retarding Admixtures .....	707.2
Water Reducing Admixtures .....	707.3
**Pozzolonic Additives .....	707.4
Mixing Water .....	715.7
Reinforcing Steel .....	709.1
Prestressing Steel .....	709.2
Hot-Poured Elastic Type Concrete Joint Sealer .....	708.3
Preformed Expansion Joint Filler .....	708.1
Elastomeric Bearing Pads .....	715.14
Welded Wire Fabric .....	709.4